

TAXONOMIC CHANGES AND A NEW SPECIES IN *LASTHENIA* SECT.
AMPHIACHAENIA (COMPOSITAE: HELIANTHEAE SENSU LATO)

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ABSTRACT

A molecular phylogenetic study of the goldfield genus *Lasthenia* has clarified the relationships among taxa in the group. It has become desirable to make taxonomic and nomenclatural changes in order to reflect the relationships. *Lasthenia* sect. *Amphiachaenia* is the correct name for *L.* sect. *Baeria sensu* Ornduff (1966). The section now comprises six species and subspecies.

In consequence of a molecular phylogenetic analysis of the goldfield genus *Lasthenia* (Chan 2000; Chan et al. 2001), it has become desirable to revise the taxonomy of *L.* sect. *Baeria sensu* Ornduff (1966) (see Table 1 for a summary) to reflect the relationships of taxa within. The study utilized DNA sequence data from the internal and external transcribed spacers of 18S–26S nuclear ribosomal DNA and the 3' *trnK* intron of chloroplast DNA from multiple populations of taxa in *L.* sect. *Baeria sensu* Ornduff (1966) and close relatives. Relationships shown by molecular data are supported by morphology, chromosome numbers, and flavonoid chemistry (Bohm et al. 1974; Ornduff et al. 1974).

Ornduff (1966) included *Burrielia hirsuta* in his circumscription of *L.* sect. *Baeria sensu* Ornduff (1966) and did not account for the earlier sectional name *Burrielia* DC. sect. *Amphiachaenia* Nutt. The older sectional name is used here:

Lasthenia Cass. sect. ***Amphiachaenia*** (Nutt.) R. Chan, *comb. nov.* ≡ *Burrielia* DC. sect. *Amphiachaenia* Nutt., *Trans. Amer. Phil. Soc. n.s.* 7: 381. 1841.—TYPE SPECIES: *Burrielia hirsuta* Nutt. = *Lasthenia gracilis* (DC.) Greene.

Baeria Fisch. & Mey., *Index Sem Hort. Petrop.* 2: 29. 1836; *Linnaea* 11(Litt. Ber.): 96. 1837. ≡ *Lasthenia* Cass. sect. *Baeria* (Fisch. & Mey.) Ornduff, *Univ. Calif. Publ. Bot.* 40: 56. 1966, nom. illegit.—TYPE SPECIES: *Baeria chrysostoma* Fisch. & Mey. = *Lasthenia californica* DC. ex Lindl.

Leaves entire. Involucres bell-shaped, depressed-hemispheric, hemispheric, or obconic. Phyllaries free. Disc florets 10–100+, corollas 5-lobed, floral pigments turning bright red in dilute alkali. Anther tips deltate or sublanceolate to subulate, broadened above the base. Cypselae pappose or epappose; pappi monomorphic. $2n = 16, 32, 48$.

Maximum parsimony analysis has yielded results

showing that *L.* sect. *Amphiachaenia* is monophyletic only with the inclusion of *L. leptalea* from *L.* sect. *Burrielia*. More importantly, this study shows that *L. californica sensu* Johnson and Ornduff 1978 and *sensu* Ornduff 1993; both = *L. chrysostoma sensu* Ornduff 1966) is cryptically diverse and is resolved into two robustly supported clades. One clade includes *L. macrantha pro parte*; the other may be sister to all other members of *L.* sect. *Amphiachaenia*. Each clade can be morphologically diagnosed by pappus morphology (see Fig. 1) and has a partially distinct distribution. No other morphological characters were found that could reliably distinguish the two clades. Although Rajakaruna and Bohm (1999) concluded that two geographical races of *L. californica sensu* Ornduff (1993) correspond to two edaphically distinct groups, I found that members of both clades span the habitat types to which the edaphic races appear to be restricted (N. Rajakaruna pers. comm.). In light of this, I have recognized each clade of *L. californica sensu stricto* as different species in *L.* sect. *Amphiachaenia* and have included *L. leptalea* in the section.

The smallest clade comprising *L. macrantha* also includes one clade of *L. californica sensu* Ornduff (1993). *Lasthenia macrantha* subsp. *bakeri* and *L. macrantha* subsp. *macrantha* and this clade of *L. californica sensu* Ornduff (1993) form a monophyletic group with *L. macrantha* subsp. *prisca* emerging as sister to this robustly supported clade. These results support previous interpretations of a close relationship between *L. californica sensu* Ornduff (1993) and *L. macrantha*. Close relationship between these two species was first recognized by Gray (1857), who treated them as varieties of the same species. Ornduff (1966) discussed the relationships in detail and Ornduff (1971) stated that *L. californica sensu* Ornduff 1993 “may be viewed as an annual version of *L. macrantha*.”

The close relationship between a clade of *L. californica sensu* Ornduff (1993), *L. macrantha* subsp. *bakeri*, and *L. macrantha* subsp. *macrantha* should now be reflected in their taxonomy by treating these

TABLE 1. COMPARISON BETWEEN *LASTHENIA* SECTS. *BAERIA* AND *BURRIELIA* SENSU ORNDUFF (1966, 1971, 1993) AND THE REVISED TAXONOMY. Corresponding species and subspecies are shown on the same line. *—sect. *Amphiachaenia* is the correct name for sect. *Baeria sensu* Ornduff (1966). **—*L. gracilis* was previously recognized as part of *L. californica sensu* Ornduff (1966, 1993).

<i>Lasthenia</i> Cass. sensu Ornduff (1966, 1971, 1993)	<i>Lasthenia</i> Cass.
sect. <i>Baeria</i> (Fisch. & Mey.) Ornduff	sect. <i>Amphiachaenia</i> (DC.) R. Chan*
<i>L. californica</i> DC. ex Lindl.	<i>L. gracilis</i> (DC.) Greene**
<i>L. macrantha</i> (A. Gray) Greene	<i>L. californica</i> DC. ex Lindl.
subsp. <i>macrantha</i>	subsp. <i>californica</i>
subsp. <i>bakeri</i> (J. T. Howell) Ornduff	subsp. <i>macrantha</i> (A. Gray) R. Chan
subsp. <i>prisca</i> Ornduff	subsp. <i>bakeri</i> (J. T. Howell) R. Chan
sect. <i>Burrielia</i> (DC.) Ornduff	<i>L. ornduffii</i> R. Chan
<i>L. leptalea</i> (A. Gray) Ornduff	<i>L. leptalea</i> (A. Gray) Ornduff
<i>L. debilis</i> (Greene ex A. Gray) Ornduff	sect. <i>Burrielia</i> (DC.) Ornduff
<i>L. microglossa</i> (DC.) Greene	<i>L. debilis</i> (Greene ex A. Gray) Ornduff
	<i>L. microglossa</i> (DC.) Greene

three taxa as members of *L. californica sensu stricto*. I am provisionally continuing to recognize these three taxa (as subspecies) pending further studies to assess relationships in the clade. The molecular results, coupled with differences in morphology (D. Keil pers. comm.) also suggest that *L. macrantha* subsp. *bakeri* and *L. macrantha* subsp. *macrantha* populations at the southernmost parts of their ranges may warrant treatment as distinct taxa in their own right.

I have assigned *L. macrantha* subsp. *prisca* to species rank as *L. ornduffii* based on chromosomal, morphological, biogeographical, physiological, and molecular evidence (Chan 2000; Chan et al. 2001; Ornduff 1971). *Lasthenia macrantha* subsp. *prisca* is a tetraploid Oregonian endemic with fleshy roots and narrower leaves compared to the hexaploid Californian subspecies with tap roots and broader leaves. Ornduff (1966) also reported that the Oregon populations of *L. macrantha* are long-lived pe-

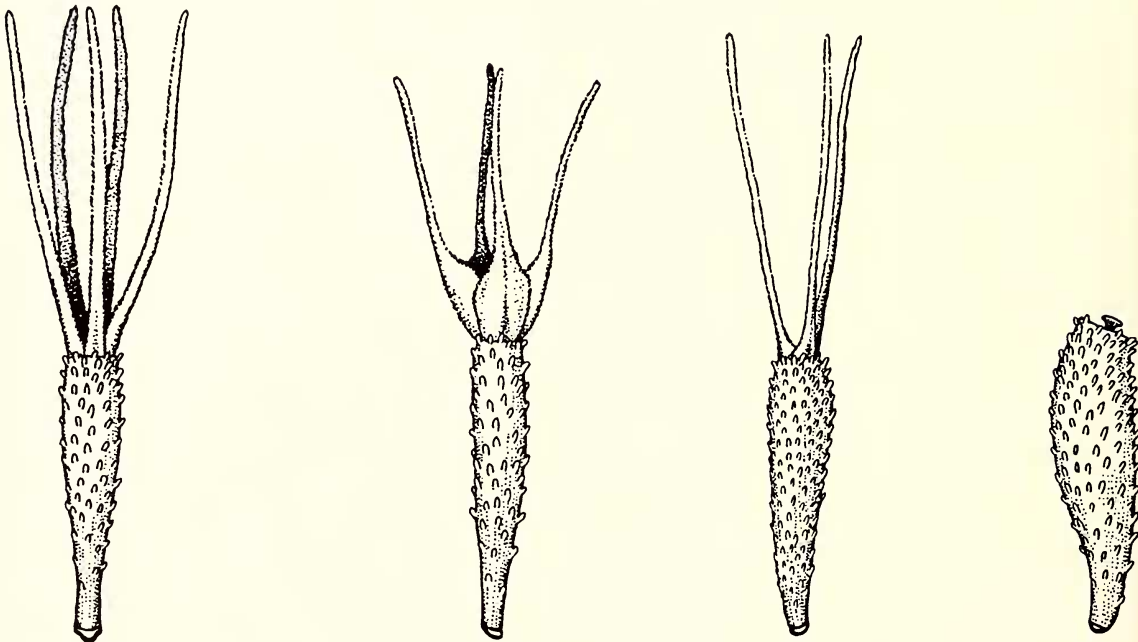


FIG. 1. Different pappus types present in *L. californica* subsp. *californica* and *L. gracilis*. A—clear to brown linear awns (*L. californica* subsp. *californica* only); B—opaque, white, ovate-lanceolate scales, each tapering to an awn (*L. gracilis* only); C—clear to brown subulate awns (*L. californica* subsp. *californica* only); D—epappose (both *L. californica* subsp. *californica* and *L. gracilis*). Dimensions are given in descriptions in the text.

rennials whereas their Californian counterparts may flower during the first year and behave as annuals under prolonged drought conditions.

KEY TO *LASTHENIA* SECT. *AMPHIACHAENIA*

1. Plants annual; coastal or inland.
 2. Stems glabrous proximally; receptacles narrowly conic; phyllaries usually 3–6, glabrous except at tips; anther tips subulate; interior western California (Monterey and San Luis Obispo counties) 3. *L. leptalea*
 2. Stems pubescent; receptacles conical; phyllaries usually 6–13, pubescent; anther tips deltate; coastal or inland.
 3. Pappi, when present, of 1–7, clear to brown, linear to subulate awns (see Figs. 1A and 1C); northern California and Oregon 1a. *L. californica* subsp. *californica*
 3. Pappi, when present, of (2–)4(–6) opaque, white, ovate-lanceolate scales, each tapering to an awn (see Fig. 1B); California (including the Channel Islands), central Arizona, and Baja California (including Guadalupe Island) 2. *L. gracilis*
1. Plants perennial; coastal.
 4. Roots fleshy, clustered; stems erect, 0–2+ branched; leaves usually 1–2 mm wide; California 1b. *L. californica* subsp. *bakeri*
 4. Roots not fleshy, not clustered; stems decumbent, usually 0–5+ branched at base; leaves usually 2–5.5 mm wide; California or Oregon.
 5. Leaves 28–88 mm long; laminae of ray corollas 6–18 mm long; California 1c. *L. californica* subsp. *macrantha*
 5. Leaves usually 20–40 mm long; laminae of ray corollas 5–9 mm long; southern Oregon 4. *L. ornduffii*

1. *Lasthenia californica* DC. ex Lindl., Edwards's Bot. Reg. 21: facing pl. 1780. 1835.—TYPE: "HHS [Hort. Horticultural Society of London]," grown in London from seeds collected in California by David Douglas, *J. Lindley s.n.* (holotype: CGE!).

Plants annual or perennial, 5–40 cm. Roots fibrous, from taproot or fleshy, clustered. Stems erect or decumbent, simple or 1–5(–20+)-branched, \pm pubescent or hirsute. Leaves linear to oblanceolate, 8–210 mm long, 1–5.5(–15) mm wide, entire or with 3–5+ short, lateral teeth, \pm fleshy in coastal forms, glabrous or sparsely to densely pubescent, or \pm hirsute. Involucres bell-shaped, depressed-hemispheric, or hemispheric. Phyllaries 4–16, 5–14 mm long, pubescent. Receptacles conic, muricate, usually glabrous. Ray florets 6–16, laminae of ray corollas 5–18 mm long. Anther tips deltate to sub-lanceolate. Style tips deltate with apical tufts of hairs and subapical fringe of shorter hairs. Cypselae linear to \pm club-shaped, 2–4 mm long, glabrous or pubescent, pappose or epappose; pappi of 1–7, clear to brown, linear to subulate awns. $2n = 16$, 32, 48.

1a. *Lasthenia californica* DC. ex Lindl. subsp. *californica*

Baeria chrysostoma Fisch. & Mey., Index Sem. Hort. Petrop. 2: 29. 1836; Linnaea 11(Litt. Ber.): 96. 1837. \equiv *Burrielia chrysostoma* (Fisch. & Mey.) Torr. & A. Gray, Fl. N. Amer. 2: 379 1842. \equiv *Lasthenia chrysostoma* (Fisch. & Mey.) Greene, Man. Bot. San Francisco 205. 1894.—LECTOTYPE (Ornduff, 1966, p. 57): California, Sonoma Co., vicinity of present-day Fort Ross, protologue: "Hab. circa coloniam Rutherfordum Ross, in sinu Bodega, Nova California," 1832, collector unknown (L; isolectotype: BM!).

Baeria gracilis A. Gray var. *aristosa* A. Gray, Proc. Amer. Acad. Arts 19: 21. 1883. \equiv *Baeria aristosa* (A. Gray) Howell, Fl. N. W. Amer. 1: 354. 1900.—TYPE: illustration in Bot. Mag. 66(13 n.s.): pl. 3758. 1840.

Lasthenia hirsutula Greene, Man. Bot. San Francisco 206. 1894. \equiv *Baeria hirsutula* (Greene) Greene, Fl. Fran. 438. 1897. \equiv *Baeria chrysostoma* Fisch. & Mey. subsp. *hirsutula* (Greene) Ferris, Contr. Dudley Herb. 5: 99. 1958.—LECTOTYPE (Ornduff, 1966, p. 57): California, Monterey Co., Pt. Lobos, protologue: "Along the seacoast from Marin Co. southward," 1 Jul 1891, E. L. Greene s.n. (ND!).

Plants annual. Roots fibrous, from taproot. Stems erect or decumbent, simple or 1–6(–10+)-branched, \pm hirsute. Leaves 8–70 mm long, 1–3 mm wide, \pm hirsute. Involucres bell-shaped or hemispheric. Phyllaries 4–13, 5–10 mm long. Ray florets 6–13, laminae of ray corollas 5–10 mm long. Anther tips deltate. Style tips deltate with apical tufts of hairs and subapical fringe of shorter hairs. Cypselae \pm club-shaped, 2–3 mm long, glabrous or pubescent, pappose or epappose; pappi of 1–7, clear to brown, linear to subulate awns. $2n = 16$, 32, 48.

Lasthenia californica subsp. *californica* grows in a variety of habitats in southwestern Oregon and northern California. Within California, *L. californica* subsp. *californica* is found from northern Monterey, Santa Clara, Merced, and Madera counties northwards. *Lasthenia californica* subsp. *californica* was previously circumscribed together with *L. gracilis* as *L. californica sensu* Ornduff (1993). *Lasthenia californica* subsp. *californica* is morphologically very similar to *L. gracilis* but it can be distinguished from *L. gracilis* by its clear to brown, linear to subulate pappus awns (see Fig. 1A and 1C) and more northern distribution. In sympatric populations, epappose plants cannot be easily distinguished morphologically. Elevation 0–1,500 m. Flowering Feb–Jun.

Lasthenia hirsutula is a polyphyletic taxon comprising the maritime populations of *Baeria chrysostoma*. Plants matching the pappus morphology of both *L. californica* subsp. *californica* and *L. gracilis* are known to have been included in the

original circumscription of *L. hirsutula* (D. Keil pers. comm.). The type specimen of *L. hirsutula* possesses the pappus morphology of *L. californica* subsp. *californica* and is thus included here.

1b. *Lasthenia californica* DC. ex Lindl. subsp. *bakeri* (J. T. Howell) R. Chan, *comb. nov.* = *Baeria bakeri* J. T. Howell, *Leafl. W. Bot.* 1: 7. 1932. = *Baeria macrantha* (A. Gray) A. Gray var. *bakeri* (J. T. Howell) Keck, *Aliso* 4: 101. 1958. = *Lasthenia macrantha* (A. Gray) A. Gray subsp. *bakeri* (J. T. Howell) Ornduff, *Univ. Calif. Publ. Bot.* 40: 62. 1966.—TYPE: California, Mendocino Co., Pt. Arena, protologue: "meadow opening in the forest on the coastal plain, six miles south of Pt. Arena," 26 Jun 1931, M. S. Baker 5283 (holotype: CAS; isotype: US).

Plants perennial (rarely annual or flowering first year). Roots fleshy, clustered. Stems erect, simple or 1–2(–4+)-branched, ± pubescent. Leaves 20–210 mm long, 1–2 mm wide, glabrous or sparsely to densely pubescent, basally clustered. Involucres bell-shaped to depressed-hemispheric. Phyllaries 13–16, 9–14 mm long. Ray florets 8–16, laminae of ray corollas 5–16 mm long. Anther tips deltate to sublanceolate. Style tips deltate with apical tufts of hairs and subapical fringe of shorter hairs. Cypselae linear to narrowly club-shaped, 2–4 mm long, usually glabrous, pappose or epappose; pappi of 1–4, clear to brown, subulate awns, variable or missing in some florets of a head. $2n = 48$.

Lasthenia californica subsp. *bakeri* grows in grasslands and woods along the coast in Mendocino and Sonoma counties. Populations of this rare subspecies appear to be increasingly more difficult to locate because of habitat destruction. Elevation 0–500 m. Flowering year round, mostly May–Jun.

1c. *Lasthenia californica* DC. ex Lindl. subsp. *macrantha* (A. Gray) R. Chan, *comb. nov.* = *Burrielia chrysostoma* (Fisch. & Mey.) Torr. & A. Gray var. *macrantha* A. Gray in J. Torrey, *Pacif. Railr. Rep.* 4(5): 106. 1857. = *Baeria macrantha* (A. Gray) A. Gray, *Proc. Amer. Acad. Arts* 19: 21. 1883. = *Lasthenia macrantha* (A. Gray) Greene, *Man. Bot. San Francisco* 205. 1894. = *Baeria macrantha* (A. Gray) A. Gray var. *littoralis* Jeps., *nom. illegit.*, *Man. Fl. Pl. Calif.* 1112. 1925.—TYPE: California, Marin Co., Pt. Reyes, protologue: "Punta de los Rey[e]s," Apr 1854, Bigelow *s.n.* (holotype: GH; isotypes: K, NY).

Baeria macrantha (A. Gray) A. Gray var. *pauciaristata* A. Gray, *Proc. Amer. Acad. Arts* 19: 21. 1883.—LECTOTYPE (Ornduff, 1966, p. 59): California, Mendocino Co., protologue: "sea shore," 4 Aug 1882, C. G. Pringle *s.n.* (GH; isotypes: K, NY).

Baeria macrantha (A. Gray) A. Gray var. *thalassophila* J. T. Howell, *Leafl. W. Bot.* 5: 108. 1948.—TYPE: California, Marin Co., Dillons Beach, protologue: "on ocean bluffs just above

the high-tide line," 30 Apr 1947, J. T. Howell 23108 (holotype: CAS; isotypes: UC!, US).

Plants perennial (rarely annual or flowering first year). Roots fibrous, from taproot. Stems usually decumbent, simple or 1–5(–20+)-branched at base, ± pubescent. Leaves 28–88 mm long, 1.5–5.5(–15) mm wide, glabrous to densely pubescent. Involucres bell-shaped to depressed-hemispheric. Phyllaries 9–16, 9–14 mm long. Ray florets 8–16, laminae of ray corollas 6–18 mm long. Anther tips deltate to sublanceolate. Style tips deltate with apical tufts of hairs and subapical fringe of shorter hairs. Cypselae linear to narrowly club-shaped, 2–4 mm long, usually glabrous, pappose or epappose; pappi of 1–4, clear to brown, subulate awns, variable or missing in some florets of a head. $2n = 48$.

Lasthenia californica subsp. *macrantha* grows in grasslands or on dunes along the immediate coast in Humboldt, Mendocino, Sonoma, Marin, San Mateo, and San Luis Obispo counties, California. *Lasthenia californica* subsp. *macrantha* is morphologically very similar to *L. ornduffii*; their ranges are allopatric. Elevation 0–500 m. Flowering year round, mostly May–Aug.

2. *Lasthenia gracilis* (DC.) Greene, *Man. Bot. San Francisco* 206. 1894. = *Burrielia gracilis* DC., *Prodr.* 5: 664. 1836. = *Baeria gracilis* (DC.) A. Gray, *Proc. Amer. Acad. Arts* 9: 196. 1874. = *Baeria chrysostoma* Fisch. & Mey. var. *gracilis* (DC.) H. M. Hall, *Univ. Calif. Publ. Bot.* 3: 170. 1907. = *Baeria chrysostoma* Fisch. & Mey. subsp. *gracilis* (DC.) Ferris, *Contr. Dudley Herb.* 5: 100. 1958.—TYPE: California, protologue: "In Nova-California legit cl. Douglas," *D. Douglas s.n.* (holotype: G!; isotypes: BM!, GH, K, NY).

Burrielia tenerrima DC., *Prodr.* 5: 664. 1836. = *Baeria tenerrima* (DC.) A. Gray, *Proc. Amer. Acad. Arts* 9: 196. 1874. = *Baeria gracilis* (DC.) A. Gray var. *tenerrima* (DC.) A. Gray, *Syn. Fl. N. Amer.* 1²: 326. 1884. = *Baeria chrysostoma* Fisch. & Mey. f. *tenerrima* (DC.) H. M. Hall, *Univ. Calif. Publ. Bot.* 3: 171. 1907.—TYPE: California, protologue: "In Nova-California legit cl. Douglas," *D. Douglas s.n.* (holotype: G!; isotypes: BM!, K, NY).

Burrielia hirsuta Nutt., *Trans. Amer. Phil. Soc. n.s.* 7: 381. 1841.—TYPE: California, Santa Barbara Co., protologue: "Hab. Santa Barbara," *T. Nuttall s.n.* (holotype: BM!; isotype: GH).

Burrielia longifolia Nutt., *Trans. Amer. Phil. Soc. n.s.* 7: 380. 1841.—TYPE: California, Santa Barbara Co., protologue: "near Santa Barbara," *T. Nuttall s.n.* (holotype: BM!). [This specimen is also the type of *Baeria gracilis* (DC.) A. Gray var. *paleacea* A. Gray.]

Burrielia parviflora Nutt. *Trans. Amer. Phil. Soc. n.s.* 7: 381. 1841.—TYPE: California, Santa Barbara Co., protologue: "near Santa Barbara," *T.*

Nuttall s.n. (holotype: BM! [label states "St. Diego"]; isotypes: GH, NY).

Baeria palmeri A. Gray, Bot. Calif. 1: 376. 1876. ≡ *Baeria chrysostoma* Fisch. & Mey. var. *palmeri* (A. Gray) J. T. Howell, Leaflet. W. Bot. 3: 152. 1942.—LECTOTYPE (Ornduff, 1966, p. 57): Mexico, Guadalupe Island, 1875, *E. Palmer* 45 (PH; isolectotypes: BM, F, K, L, MBG, NY).

Baeria gracilis (DC.) A. Gray var. *paleacea* A. Gray, Proc. Amer. Acad. Arts 19: 21. 1883. ≡ *Baeria chrysostoma* Fisch. & Mey. f. *paleacea* (A. Gray) H. M. Hall, Univ. Calif. Publ. Bot. 3: 171. 1907.—LECTOTYPE (designated here): California, Santa Barbara Co., protologue: "near Santa Barbara," *T. Nuttall s.n.* (BM!). [This specimen is also the type of *Burrielia longifolia* Nutt.]

Baeria clevelandii A. Gray, Proc. Amer. Acad. Arts 19: 22. 1883.—TYPE: California, San Diego Co., protologue: "near San Diego," 1874, *D. Cleveland s.n.* (holotype: GH).

Baeria curta A. Gray, Proc. Amer. Acad. Arts 19: 21. 1883. ≡ *Baeria chrysostoma* Fisch. & Mey. f. *curta* (A. Gray) H. M. Hall, Univ. Calif. Bot. Publ. Bot. 3: 172. 1907.—LECTOTYPE (Ornduff, 1966, p. 57): California, San Bernardino Co., protologue: "near San Bernardino," 1880, *J. G. Lemmon* 135, (GH; isolectotype: UC!).

Baeria palmeri A. Gray var. *clementina* A. Gray, Syn. Fl. N. Amer. ed. 2, 1²: 452. 1886. ≡ *Baeria chrysostoma* Fisch. & Mey. f. *clementina* (A. Gray) H. M. Hall, Univ. Calif. Bot. Publ. Bot. 3: 172. 1907.—TYPE: California, San Clemente Island, 1885, *J. C. Nevin* and *D. Lyon s.n.* (holotype: GH; isotypes: DS, ND).

Baeria chrysostoma Fisch. & Mey. f. *nuda* H. M. Hall, Univ. Calif. Bot. Publ. Bot. 3: 170. 1907.—TYPE: California, Los Angeles Co., protologue: "San Francisquito Cañon," 3 May 1902, *H. M. Hall* 3100 (UC!).

Baeria chrysostoma Fisch. & Mey. f. *crassa* H. M. Hall, Univ. Calif. Bot. Publ. Bot. 3: 172. 1907.—TYPE: California, San Diego Co., protologue: "Ocean Beach near San Diego," May 1906. *K. Brandege* (holotype: UC!; isotypes: UC!, DS).

Plants annual, 5–40 cm. Roots fibrous, from taproot. Stems erect or decumbent, simple or 1–6(–10+)-branched, ± strigose. Leaves linear to oblanceolate, 8–70 mm long, 1–3 mm wide, entire or with 3–5+ short, lateral teeth, ± fleshy in coastal forms, glabrous or ± strigose. Involucres bell-shaped or hemispheric. Phyllaries 4–13, 5–10 mm long, ± strigose. Receptacles conic, muricate, glabrous. Ray florets 6–13, laminae of ray corollas 5–10 mm long. Anther tips deltate. Style tips deltate with apical tufts of hairs and subapical fringe of shorter hairs. Cypselae ± linear, 2–3 mm long, glabrous or pubescent, pappose or epappose; pappi of 2–6, usually 4, opaque, white, ovate-lanceolate scales, each tapering to an awn. $2n = 16, 32$.

Keck (1959) said of *L. gracilis* (as *Baeria chrysostoma* subsp. *gracilis*) "The most abundant composite in the state [of California]." It grows in a wide variety of soils and habitats throughout California, central Arizona, the Channel Islands, Guadalupe Island, and Baja California. It was circumscribed together with *L. californica* subsp. *californica* as *L. californica* by Ornduff (1993). It is morphologically very similar to *L. californica* subsp. *californica* and to *L. leptalea* but can be distinguished from *L. californica* subsp. *californica* and *L. leptalea* by its opaque, white, ovate-lanceolate scales, each tapering to an awn (see Fig. 1B). Elevation 0–1,500 m. Flowering Feb–Jun.

3. *Lasthenia leptalea* (A. Gray) Ornduff, Univ. Calif. Publ. Bot. 40: 63. 1966. ≡ *Burrielia leptalea* A. Gray, Proc. Amer. Acad. Arts 6: 546. 1865. ≡ *Baeria leptalea* (A. Gray) A. Gray, Syn. Fl. N. Amer. 1²: 325. 1884.—TYPE: California, Monterey Co., Santa Lucia Mountains, protologue: "on very dry hillside along the Nacismento [Nacimiento] River," 2 May 1861, *W. H. Brewer* 548 (holotype: GH; isotypes: K, UC!, US).

Plants annual, 5–15 cm. Roots fibrous, from taproot. Stems erect, simple or 1–5+-branched, glabrous proximally, densely villous in peduncular region. Leaves linear, 3–20 mm long, entire, sparsely pubescent. Involucres obconic to bell-shaped. Phyllaries 3–6, 4–6 mm long, glabrous but for pubescent tips. Receptacles narrowly conic, glabrous. Ray florets 6–9, laminae of ray corollas 2.5–5 mm long. Anthers tips subulate. Style tips ± deltate, with long apical pubescence. Cypselae linear to narrowly club-shaped, ca. 2 mm long, sparsely pubescent; pappi of 1–4, white to yellowish, narrowly tapered awns, missing in some florets of a head. $2n = 16$.

Lasthenia leptalea usually grows in open areas of oak woodlands, interior southern Monterey and northern San Luis Obispo counties, California. *Lasthenia leptalea* is morphologically very similar to *L. gracilis*; it can be consistently distinguished from *L. gracilis* by its subulate anther tips and phyllaries pubescent at the tips. Elevation 0–650 m. Flowering Feb–Apr.

4. *Lasthenia ornduffii* R. Chan, *sp. nov.* Based on: *Lasthenia macrantha* (A. Gray) Greene subsp. *prisca* Ornduff, Madroño 21: 96. 1971.—TYPE: Oregon, Curry Co., protologue: "very abundant on Cape Blanco," 16 Jul 1929, *L. F. Henderson* 11400 (holotype: UC!; isotypes: ORE, PH).

Plants perennial (rarely annual or flowering first year), 5–40 cm. Roots fibrous, from taproot. Stems usually decumbent, 1–3+-branched at base, ± pubescent. Leaves linear to oblong, 20–40 mm long, 1.8–3 mm wide, glabrous or densely pubescent. Involucres bell-shaped to depressed-hemispheric.

Phyllaries 8–14, 9–14 mm long, pubescent. Receptacles conic, muriccate, usually glabrous. Ray florets 8–15, laminae of ray corollas 5–9 mm long. Anther tips deltate to sublanceolate. Style tips deltate, hair-tufted. Cypselae linear to narrowly club-shaped, 2.5–4 mm long, usually glabrous, pappose or epappose; pappi of 1–4, clear to brown, subulate awns, often variable or missing in some florets of a head. $2n = 32$.

Lasthenia ornduffii is known from six or so populations in grasslands along the immediate coast in Curry Co., southern Oregon. Elevation 0–500 m. Flowering year round, mostly May–Aug.

Lasthenia ornduffii was originally described as a tetraploid subspecies of *L. macrantha*. The species name is intended to honor the late Professor Emeritus Robert Ornduff, a native Oregonian, in appreciation of his outstanding contributions to our understanding of the evolution of *Lasthenia* and other groups in the California flora.

Excluded names (L. californica sensu Ornduff 1993):

Baeria punctata Greene ex C. F. Baker, W. Amer. Plants 2: 8. 1903, nom. nudum. Based on *C. F. Baker 2962*, Lakeport, Lake Co., California.

Baeria subcilata Greene ex C. F. Baker, W. Amer. Plants 2: 8. 1903, nom. nudum. Based on *C. F. Baker 2857*, Lake Merced, San Francisco Co., California.

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toral dissertation submitted to the Department of Integrative Biology, University of California, Berkeley.

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